

**15E/16E(A)**

This Question Paper contains 3 Printed Pages.

Question Booklet Sl. No.

MATHEMATICS
(English Version)
(Parts A and B)

Time : 3 Hours /

Roll Number. _____

/ Maximum Marks : 80

Instructions :

1. Answer **all** the Questions of **Part - A** on a **separate** answer book.
2. Write the answers to the Questions under **Part - B** on the Question paper itself and attach it to the answer book of **Part - A**.

PART - A

Time : 2 Hours 30 Minutes /

/ Marks : 60

SECTION - I

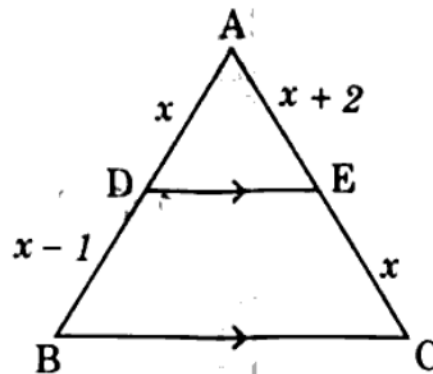
(6×2=12 Marks)

Note : (1) Answer all the following questions.

(2) Each question carries 2 marks.

1. Find the value of $\log_{\sqrt{5}} 64$.
2. Check whether the pair of linear equations $2x - 3y = 8$ and $4x - 6y = 11$ are consistent. Justify your answer.
3. "An observer standing at a distance of 30 metre from the foot of a tree observes its top at an angle of elevation of 60° ". Draw a suitable diagram for this situation.
4. Express $\cot \theta$ in terms of $\sin \theta$.

5. In $\triangle ABC$, $DE \parallel BC$ if $AD = x$, $DB = x - 1$, $AE = x + 2$ and $EC = x$ then find the value of x .



6. Write one example each of a "Sure event" and "Impossible event".

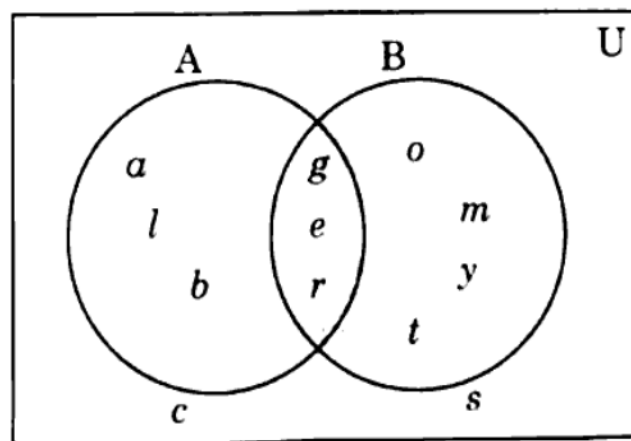
SECTION - II

(6×4=24 Marks)

Note : (1) Answer **all** the following questions.

(2) **Each** question carries 4 marks.

7. From the given Venn diagram, find the sets $A \cup B$, $A \cap B$, $A - B$ and $B - A$.



8. Write the formula for finding the n^{th} term of an arithmetic progression and explain each term in it.
9. A bag contains 5 red balls, 3 black balls and 2 white balls. If one ball is selected at random from the bag, find the probability of
- getting a red ball
 - not getting a white ball

10. If $P = \sqrt{\frac{1+\sin\theta}{1-\sin\theta}}$ then show that $P + \frac{1}{P} = 2\sec\theta$.
11. The roots of the quadratic equation $ax^2 + bx + c = 0$ are such that one root is twice the other. Show that $2b^2 = 9ac$.
12. A Hemispherical tank of radius 3 metre is full of water. The water is to be transferred into small cylindrical containers each of radius 1 metre and height 2 metre. Find the number of cylinders needed.

SECTION - III

(4×6=24 Marks)

Note : (1) Answer **any four** questions from the given six questions.

(2) **Each** question carries **6** marks.

13. Prove that $3\sqrt{5} + 2\sqrt{7}$ is an irrational number.
14. Draw the graph of the quadratic polynomial $P(x) = x^2 - 3x - 4$ and find its zeroes from the graph.
15. Find the points of trisection of the line segment joining the points $(-4, 3)$ and $(5, 9)$.
16. Find the mean of the following data.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	3	6	7	12	9	5	6	2

17. Construct a triangle with sides 6 cm, 8 cm and 5 cm then construct another triangle similar to it whose sides are $\frac{5}{3}$ of the corresponding sides of the first triangle.
18. In a sector, the length of the arc is 7 cm more than its radius. If the area of the sector is 147 cm^2 then find the lengths of the radius and the arc.